TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF UNDERGROUND STORAGE TANKS
ENVIRONMENTAL ASSESSMENT REPORT
GUIDELINES

Instructions:

The Environmental Assessment Report (EAR) shall be prepared for those sites which do not qualify for site ranking or the total site score exceeds the action number in accordance with Technical Guidance Document - 014, UST Site Ranking System. The EAR shall contain all data gathered during field activities and shall fully define the petroleum contamination to the applicable cleanup levels. All environmental assessment activities and evaluation of the subsurface investigation shall be directed by a registered professional geologist under the Tennessee Geologist Act (*T.C.A. §62-36-101 et seq.*), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (*T.C.A. §62-2-101 et seq.*).

If the EAR has not been submitted by the established deadline, a written request, justifying an extension shall be submitted to the appropriate field office before the deadline. The extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may place the responsible party out of substantial compliance and may result in the loss of fund coverage.

Each section of the EAR shall be prepared and assembled in the order presented within these guidelines. Text shall be provided explaining the associated tables and maps. All variations from the procedures detailed in the Environmental Assessment Guidelines (EAG) shall be justified. All maps and tables shall be in appropriate sections, not in appendices. All maps shall be on 8.5 x 11 or 11 x 17 inch paper and contain, at a minimum, a north arrow, legend, scale bar, vertical scale (if applicable), and figure number. These guidelines are intended to provide a structured outline. Any information that is not specifically requested but is relevant to the project shall also be included. The preparer shall assemble the required information in each section so as to provide a comprehensive final document. All pages of the report, including the tables and figures, shall be consecutively numbered. Each section and subsection heading shall be clearly printed in the report. A table of contents shall be provided listing the location of all sections, maps, tables, and appendices.

All correspondence, reports, laboratory analysis sheets, etc. shall contain the TN UST Facility ID Number. A copy of all correspondence and reports shall be submitted to the UST central office and the appropriate field office. Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

Environmental Assessment Report

Executive Summary

Provide an Executive Summary describing the findings of the project to date. Include conclusions and interpretations of data derived from implementing the environmental assessment activities. Identify all impacts resulting from the release.

A. Introduction

Give a brief site history emphasizing information that has not been stated in prior reports or information that has been revised based upon new findings. Include the following, at a minimum:

1. A summary of all initial abatement actions taken; and,

2. A summary of actions taken to identify and eliminate the sources of contamination.

B. Site Location

1. Provide a vicinity map showing the site location including all streets, buildings, subsurface structures and utilities within one-tenth (0.1) mile from the site.

2. Provide a scaled site map including tank, line, and dispenser locations, underground utilities, soil borings and monitoring wells, etc. Indicate former tank systems with a dashed line. This map shall also include Line A-A' which shall be a line approximately parallel to the direction of ground water flow and Line B-B' which shall be perpendicular to the direction of ground water flow. These lines shall intersect as many soil borings and/or monitoring wells as possible and shall represent the widest areas of the soil and ground water contaminant plumes. These lines shall be used for all subsequent cross section maps.

3. Provide a monitoring well location map depicting the distances and angles from monitoring well 4 (MW-4) to the established and documented point on the top of each well casing. All angles shall be from magnetic north.

4. Provide an 8.5 x 11 color topographic map with the site location indicated.

5. Provide a description of the local topography and any effects it may have on contaminant migration at the site.

C. Soil Investigation

Provide a summary of all soil investigation activities including the applicable cleanup levels. This should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc.

1. Geology

Provide the following information:

a. A description of the regional geologic section;

b. A description of the geologic section at the site;

c. A description of the soil and/or bedrock lithologies encountered at the site;

d. A plan view map showing the bedrock contour, if applicable;

e. Scaled cross section maps (along both Line A-A' and B-B') showing the soil and bedrock lithologies; and,

f. The dip and strike of the rock formations encountered, if applicable.

2. Soil Boring Results

a. Describe the methods used to drill and sample all soil borings.

b. Provide detailed boring logs in an appendix in accordance with Technical Guidance Document - 006 (TGD - 006), Standard Drilling Log.

3. Analytical Results

a. All soil analytical results from all sampling events (i.e., closure, site check, environmental assessment, etc.) shall be included in a table along with the following information:

i. Boring number or location of additional sampling points;
ii. Date sample was collected;
iii. Sample depth;
iv. Parameter (i.e. Benzene~~,~~ Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
v. Unit of measurement (Parts Per Million, PPM); and,
vi. The applicable cleanup levels.

b. Provide all laboratory analysis and chain of custody sheets in an appendix segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:

i. The TN UST Facility ID Number;
ii. Boring number or location of additional sampling points;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Sample depth;
vi. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);

vii. Unit of measurement (Parts Per Million, PPM);
viii. Analytical method; and,
ix. Authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

4. Soil Contaminant Plume Maps

Provide all rationale used to contour the contaminant plume maps to the applicable cleanup levels.

a. Provide two (2) scaled plan view maps, one showing the horizontal extent of benzene contamination and the other map showing the horizontal extent of TPH contamination. Include the location of tanks, product and vent lines, dispensers, underground utilities, soil borings and monitoring wells (properly labeled and including soil contaminant concentrations), etc. Indicate former tank systems with a dashed line.

b. Provide two (2) scaled cross section maps representing Line A-A' and Line B-B' respectively. Separate maps shall be prepared for benzene and TPH. Each shall include the following, at a minimum:

i. The location and depth of all soil borings and monitoring wells, along the respective line, with the appropriate identification;

ii. The locations at which soil samples were collected for laboratory analysis and their corresponding results;

iii. The organic vapor detector (OVD) readings from all screened soil samples;

iv. The vertical extent of benzene and/or TPH soil contamination to the applicable cleanup level, using labeled isopleths to delineate the extent of contamination;

v. The potentiometric surface;

vi. The bedrock profile, if encountered;

vii. The elevation at which ground water was first encountered; and,

viii. The location where soil property samples were collected.

D. Ground Water Investigation

Provide a summary of all activities concerning the ground water investigation including the applicable cleanup levels. This should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc.

1. Hydrogeology

a. Describe the occurrence and movement of ground water at the site and its relationship to both soil and ground water contamination. Include conclusions concerning the relationship of this site to any areas of off-site contamination, if applicable.

b. Describe the occurrence and movement of free product at the site. Include estimated quantities, source(s), pathways of migration and estimates of travel time, if applicable.

c. Provide a water level data table for all sampling events containing the following, at a minimum:

i. Monitoring well number;
ii. Date measured ;
iii. Total depth of well;
iv. Top of casing elevation relative to MSL;
v. Depth from top of casing to free product;
vi. Depth from top of casing to water;
vii. Thickness of free product;
viii. Potentiometric surface elevation relative to MSL; and,
ix. Adjusted potentiometric surface elevation relative to MSL.

All ground water measurements previously recorded shall be represented in this table.

d. Provide two (2) scaled potentiometric maps derived from data collected at least thirty (30) days apart. If multiple aquifers were investigated due to the presence of contamination in a deeper aquifer and sufficient data is generated, potentiometric maps shall be included for each. These maps shall also include arrow(s) depicting the interpreted direction of ground water flow.

e. Provide the highest calculated hydraulic gradient in cm/cm (Show calculations).

f. Provide the calculated ground water flow rate(s) in cm/yr. For all estimated values include a justification and reference (Show calculations).

g. Provide the results of any slug or pump tests.

2. Monitoring Well Construction

a. Describe the monitoring well installation procedures.

b. Provide all detailed monitoring well diagrams in an appendix in accordance with TGD - 006, Standard Drilling Log.

c. Provide a table showing the calculated volumes of the well construction materials such as sand, bentonite and grout versus the actual volumes used. If the actual and the calculated volumes differ by more than 10%, provide an explanation for the difference.

3. Well Development

Describe the procedures used to develop all monitoring wells. Provide a description of how the development water was managed.

4. Monitoring Well Sampling

Describe the procedures used to sample all monitoring wells including purging, sampling, and chain of custody protocols.

5. Analytical Results

a. Provide all ground water analytical results, from every sampling event (i.e., closure, site check, environmental assessment, etc.) in a table containing the following information, at a minimum:

i. Monitoring Well number or location of additional sampling points;
ii. Date sample was collected;
iii. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
iv. Unit of measurement (Parts Per Million, PPM); and
v. The applicable cleanup levels.

b. Provide all laboratory analysis and chain of custody sheets in an appendix segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:

i. The TN UST Facility ID Number
ii. Boring number or location of additional sampling points;
iii. Date sample was collected;
iv. Date sample analyzed;
v. Parameter (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MTBE, GRO, DRO and TPH);
vi. Dilution factor;
vii. Unit of measurement (Parts Per Million, PPM);
viii. Analytical method; and,
ix. Authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

6. Ground Water Contaminant Plume Maps

All contaminant plumes shall be defined to the applicable cleanup levels as determined in Section II of the Environmental Assessment Guidelines. Provide all rationale used to contour the contaminant plume maps to the applicable cleanup levels.

a. Provide two (2) scaled plan view maps, one map showing the horizontal extent of benzene contamination and the other map showing the horizontal extent of TPH

contamination to the applicable cleanup levels. Include the location of tanks, product and vent lines, dispensers, underground utilities, soil borings and monitoring wells (properly labeled and including ground water contaminant concentrations), etc. Indicate former tank systems with a dashed line. The horizontal extent of any free phase product shall be depicted.

b. Provide two (2) scaled cross-section maps representing Line A-A' and Line B-B' respectively. Separate maps shall be prepared for benzene and TPH. Each shall include the following, at a minimum:

i. The location and depth of all soil borings and monitoring wells, along the respective line, with the appropriate identification;

ii. The location of the screened portion of the monitoring wells;

iii. The extent of benzene and/or TPH ground water contamination to the applicable cleanup level, using labeled isopleths to delineate the extent of contamination;

iv. The potentiometric surface;

v. The bedrock profile and any fractures, voids or relevant features in the bedrock, if encountered; and,

vi. The elevation at which ground water was first encountered.

E. Corrective Action Plan Cost Estimate

Complete the following cost form showing actual costs incurred to date and all estimated costs to complete the environmental assessment.

	Estimated Costs	Actual Costs
Site Check		
Initial Abatement/ Emergency Response		
Free Product Recovery		
Initial Site Characterization		
Environmental Assessment		

F. Signature Page

A signature page, as shown below, shall be attached to the Environmental Assessment Report. The page shall be signed by the owner/operator of the UST system (or authorized representative within the organization) and a registered professional geologist under the Tennessee Geologist Act (*T.C.A. §62-36-101 et seq*.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (*T.C.A. §62-2-101 et seq*.).

We, the undersigned, certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report form and on any attachments, is true, accurate and complete to the best of our knowledge, information, and belief. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violations.

_____	_____	_____
Owner/Operator (Print name)	Signature	Date
	_____	
	Title (Print)	
_____	_____	_____
P.E. or P.G. (Print name)	Signature	Date
	_____	
	Tennessee Registration #	

Note: Each of the above signatures shall be notarized separately with the following statement.

STATE OF _____ COUNTY OF _____

Sworn to and subscribed before me by _____on this date

_____. My commission expires _____.

_____	_____	_____
Notary Public (Print name)	Signature	Date

Stamp/Seal